
2 ALTERNATIVES

The alternatives described in this document were developed to address capacity deficiencies based on findings from the traffic analysis conducted for this project, with consideration given to avoiding where possible or minimizing adverse impacts to the built and natural environment. This analysis demonstrates that the mainline freeway would require widening, and that four of the interchanges (Orchard Street, Vista Avenue, Broadway Avenue and Gowen Road) would need to be replaced with reconstructed interchanges to meet the Year 2035 forecast conditions. Multiple interchange concepts for each of these four locations were initially considered. Under each of the interchange alternatives, existing bridge structures would need to be removed and replaced.

The I-84 mainline from the Gowen Road interchange to the Eisenmann Road interchange would not require any capacity improvements to meet the forecast travel demand, therefore, only replacement of the existing pavement is proposed for that portion of the interstate. Because the Eisenmann Road interchange would not require any improvements to meet forecast travel demand, no alternatives were developed for the interchange. A more detailed description of alternatives is provided in the *Interchange Alternatives Selection Report* (March 2005) prepared by Washington Group International, Inc.

2.1 ALTERNATIVES DEVELOPMENT PROCESS

As described in Sections 2.3 and 2.5, I-84 mainline capacity improvements and multiple potential interchange alternatives were developed. The *Interchange Alternatives Report* (2005) identified design, capacity, displacements, and construction impacts, among other features, to be used for determining the most appropriate interchange design. Preliminary horizontal and vertical alignments were developed for each alternative showing limits of slopes and proposed right-of-way needs. Several factors were evaluated for each interchange to be able to rate each alternative for effectiveness.

Public open houses were held on February 26, 2003 and May 17, 2004 to provide ITD with the opportunity to present and gather questions and feedback from the public on the alternatives considered. Business owners were also contacted and a meeting was held on May 17, 2004 to identify potential concerns local businesses had with the project. A meeting was held on June 2, 2005 with the Idaho Transportation Department, District 3 and the Federal Highway Administration to compare and screen out conceptual alternatives that would not meet the purpose and need of the project. The criteria used to compare the alternatives included:

- Right-of-way and land use impacts;
- Interchange LOS;
- Potential for staged construction and constructability;

- Geometric layout considerations;
- Construction and right-of-way cost;

Each of the alternatives considered were ranked using each criterion. Interchange options with the best overall ratings were advanced, while others were no longer considered as viable alternatives.

2.2 NO-BUILD ALTERNATIVE

The No-Build Alternative would not alter the I-84 mainline or interchanges within the project area other than any foreseeable planned or programmed developments or projects to be implemented by other entities as separate and unrelated actions.

2.3 RECOMMENDED BUILD ALTERNATIVE

2.3.1 I-84 Mainline

The proposed I-84 mainline (Table 2.1) would consist of additional travel lanes, paved shoulders and median. In addition to the proposed widened travel sections, the project would include replacement of two I-84 bridge structures at two locations where I-84 crosses over railroad tracks (four total structures) – one located east of the Broadway Avenue interchange and one located west of the Gowen Road interchange. The Build Alternative would be designed to accommodate future high occupancy vehicle (HOV) lanes with minimal reconstruction work required.

Table 2.1. I-84 Mainline Build Alternative

Mainline Segment	Lanes	Shoulders	Median	Total Pavement Width
West of Orchard Street to Broadway Avenue	Four 12' lanes + one 12' auxiliary lane each direction	Two 12' shoulders each direction, 10' outside with auxiliary lane	32' paved median	192' from edge to edge
Broadway Avenue to Gowen Road	Three 12' lanes each direction	Two 12' shoulders each direction	32' paved median	144' from edge to edge
Gowen Road to Eisenmann	Two 12' lanes each direction	One 10' and one 4' shoulder each direction	68' unpaved median	38' each direction

2.3.2 Interchanges

In addition to the No-Build Alternative and the proposed I-84 mainline improvements, one alternative was advanced for each interchange. Existing and projected LOS on interchanges and the I-84 mainline are described in Section 4.1, Transportation.

2.3.2.1 Orchard Street Interchange: Conventional Diamond with Additional Lanes

This alternative (Figure 2.1) would relocate the Orchard Street bridge that crosses over I-84 to the west of the existing bridge to better align with the arterial to the south, realign ramps to minimize the need to acquire right-of-way, and widen the roadways and ramps to provide additional capacity and meet current design standards. After construction is completed, the entire interchange area would function at an LOS E or better for the p.m. peak hour under forecast Year 2035. The improvements would generally maintain the current LOS through 2035.

This Alternative would allow the existing bridge to remain in use during most of the construction period because the new interchange would be constructed slightly to the west of the existing alignment. Construction of the new interchange would require realignment of a portion of Victory Road in the southwest quadrant of the interchange.

Two driveways north of the interchange would be affected by the proposed improvements. Both of these driveways are outside of the current interstate access control limit for the interchange and are under the Ada County Highway District (ACHD) jurisdiction. The existing full access driveway to the Dennis Dillon Autopark is approximately 300 feet from the westbound ramp terminal intersection. ACHD's current policy requires a 315-foot separation. This driveway serves as the main access for customers and deliveries to and from the auto dealership and would be maintained as near to its current location as possible. As part of the interchange construction, this driveway would be relocated approximately fifteen feet to the north, meeting ACHD's access spacing standards.

The second access that would be relocated is approximately 280 feet from the westbound ramp terminal intersection. While access would be maintained for these businesses, interchange improvements would include construction of a new second driveway located approximately 35 feet north of the existing driveway. The existing driveway would remain in addition to the new full access driveway, but access would be limited to right-in/right-out turn movements. Impacts to property are discussed in Section 5.2

2.3.2.2 Vista Avenue Interchange: Single Point Urban Interchange (SPUI)

This Vista Avenue interchange alternative (Figure 2.2) would provide a SPUI in place of the conventional diamond or a diamond with loop ramps. A SPUI functions by combining the two ramp terminals into one intersection, facilitating simultaneous left turns from the ramps and the arterial approaches. Under this alternative, the ramps would be widened to provide additional capacity. This alternative would provide a LOS D or better for the forecast 2035 conditions compared to under current conditions where the on and off ramps at the Vista Avenue interchange operate at LOS E or F. This alternative would have the least impact to businesses of any alternative evaluated for Vista Avenue.

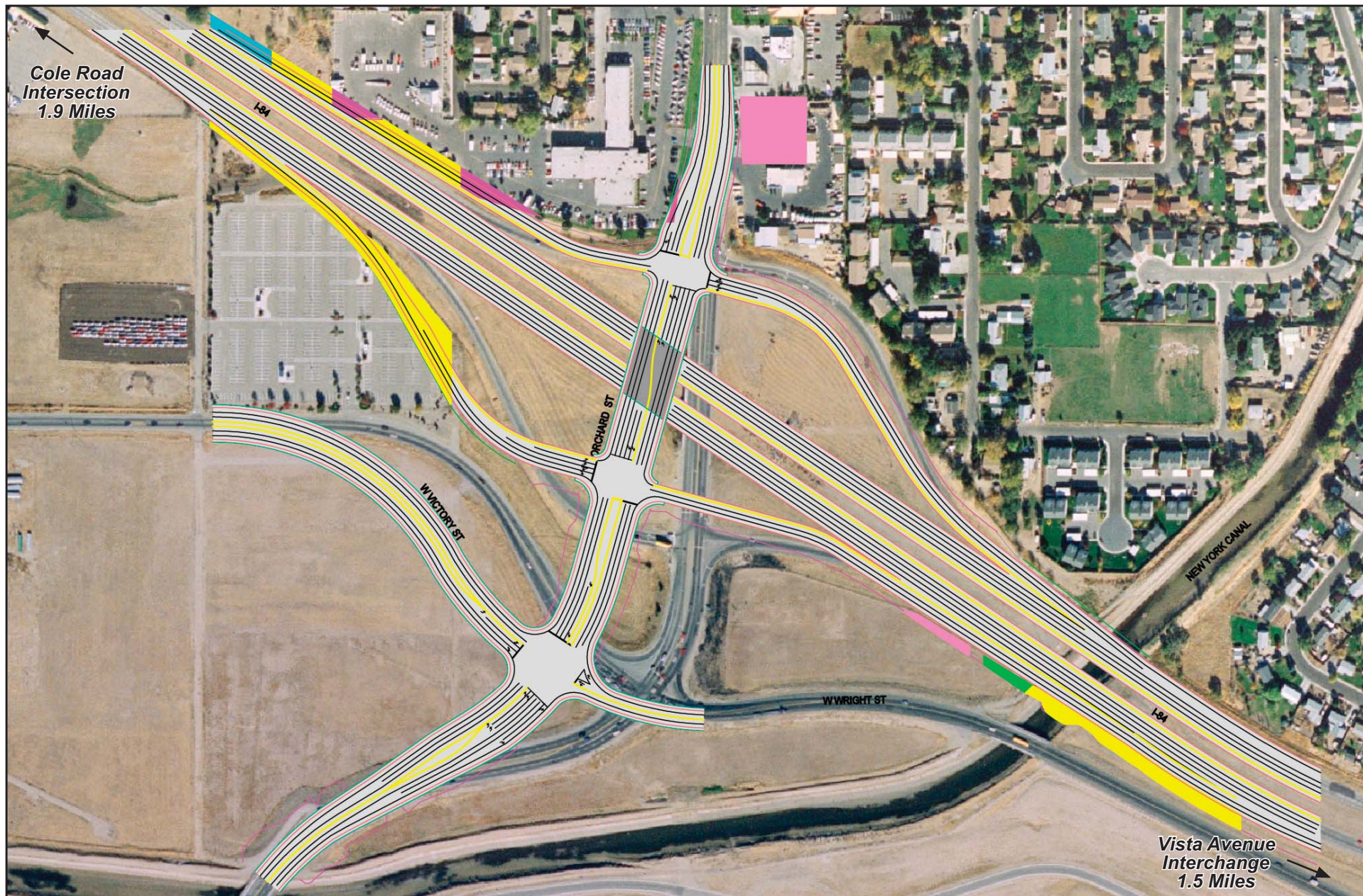


Figure 2.1
Orchard Street Interchange
Conventional Diamond with Additional Lanes

Proposed I-94 Mainline Improvements:

Mainline Segment	Lanes	Shoulders	Median
West of Orchard Street to Broadway Avenue	Four 12' lanes + one 12' auxiliary lane each direction	Two 12' shoulders each direction 10' with auxiliary lane	32' paved median



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Key No. 6492

I-94, Orchard I.C. to Gowen I.C.
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0 50 100 150 200 250
FEET

NOTE: Solid colored areas indicate estimated right-of-way acquisition needed.

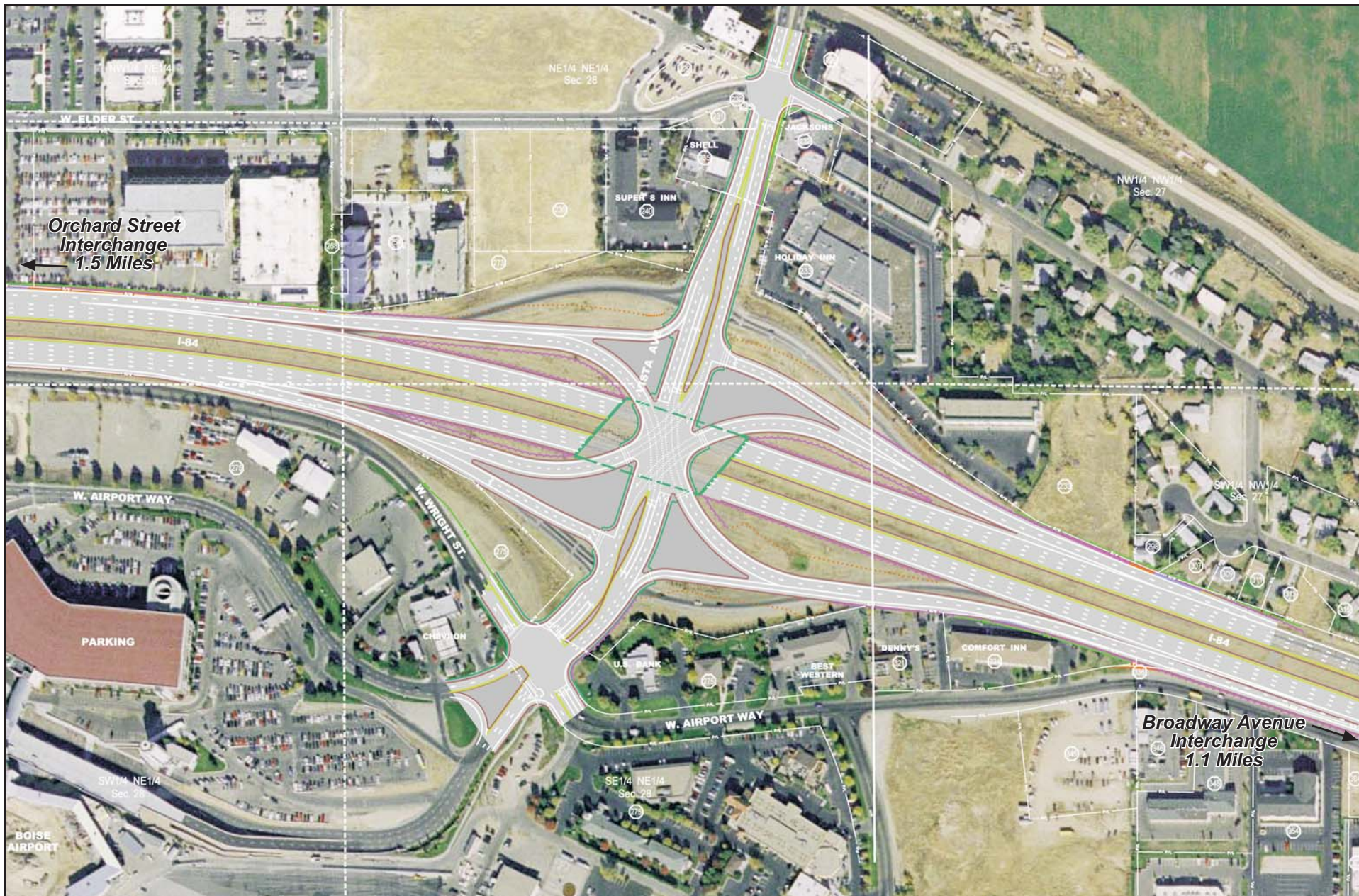


Figure 2.2
Vista Avenue Interchange
Single Point Urban Interchange

Proposed I-84 Mainline Improvements:

Mainline Segment	Lanes	Shoulders	Median
West of Orchard Street to Broadway Avenue	Four 12' lanes + one 12' auxiliary lane each direction	Two 12' shoulders each direction 10' with auxiliary lane	32' paved median



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NOTE: Solid colored areas indicate
estimated right-of-way acquisition needed.



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6492

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This alternative would include the construction of a new bridge structure in the same location as the existing structure. The new bridge, being wider than the existing, would allow for maintenance of traffic under a phased construction approach by leaving the existing bridge in service, constructing the outer portion of the new bridge, shifting traffic onto the new structure, and then removing the existing bridge and completing the new bridge. The additional right-of-way necessary for the new interchange would require very small slivers of property from the properties adjacent to the existing right-of-way in all four quadrants, but should not have any impact to the use of the business properties. The residential properties in the northeast quadrant would experience impacts to the rear yard, and one home would be displaced.

Construction of the new interchange would require access modifications for two properties, but would continue to operate at the same location. Impacts to access would occur to the Holiday Inn Hotel located in the northeast quadrant and to the Comfort Inn located in southeast quadrant. The existing access to the Holiday Inn from Vista would be limited to right-in and right-out movement only, although a new access would be provided onto Sunrise Rim Road from the northern portion of the property. This would provide a means for access via the signalized intersection of Sunrise Rim Road and Vista Avenue. Impacts to property are discussed in Section 5.2.

2.3.2.3 Broadway Avenue Interchange: Single Point Urban Interchange

As with the Vista Avenue interchange, this alternative (Figure 2.3) would provide a SPUI in place of the conventional diamond or a diamond with loop ramps. Under the forecast year 2035 conditions, this alternative would provide LOS D or better. The existing Broadway Avenue ramps vary in LOS, ranging between LOS C and LOS F. This alternative would have the least impact to businesses of any alternative evaluated for Broadway Avenue.

The Broadway Avenue interchange alternative would include the construction of a new wider bridge structure primarily in the same location as the existing one and would replace the existing ramps with wider ramps to increase capacity. The new bridge, being wider than the existing, would allow for maintenance traffic under a phased construction approach by leaving the existing bridge in service, constructing the outer portion of the new bridge, shifting traffic onto the new structure, and then removing the existing bridge and completing the new bridge. The additional right-of-way necessary for the new interchange would require very small slivers of property from the properties adjacent to the existing right-of-way in the northwest and southwest quadrants, but should not have any impact to the use of the business or residential properties, nor to any existing structures. Impacts to property are discussed in Section 5.2.

2.3.2.4 Gowen Road Interchange: Conventional Diamond with Additional Lanes and a Southeast Loop Ramp

This alternative (Figure 2.4) would maintain all the existing alignments but would widen the roadway ramps. Unlike the other three interchanges within the project area, Gowen Road travels under I-84. This alternative would require removal and construction of the existing I-84 bridge structures, widening Gowen Road to five lanes, and the reconstruction of the existing ramps to increase capacity and meet current design standards. A loop ramp would be added in the southeast quadrant to facilitate traffic from eastbound I-84 to eastbound Gowen Road. This loop ramp was identified as a key issue in the initial public review meetings due to the high volume of eastbound I-84 to northbound Idaho 21 traffic movement. The existing bridge structures would be replaced in stages during construction, maintaining two arterial traffic lanes and two freeway lanes during the construction period. The west ramps could remain open during most stages of construction, requiring intermittent detours, but the east ramps will require detours for the majority of construction. After construction is completed, the entire interchange area would function at an LOS C for the p.m. peak hour under forecast Year 2035 conditions, similar to current conditions. Impacts to property are discussed in Section 5.2.

2.3.3 Transit

No high capacity transit facilities or dedicated bus lanes, are proposed for this project, although proposed right-of-way width along the I-84 mainline would include enough width that could be dedicated to transit in the future.

2.4 OTHER PLANNED TRANSPORTATION IMPROVEMENTS

Under both the No-Build and Build Alternative, multiple transportation improvement projects are planned within the project area to address immediate transportation needs and to preserve the pavement condition on I-84 until long-term improvements are completed. The projects will maintain, replace or repair various features of I-84 including pavement, overpass bridges, canal bridges and on-ramps. Planned projects include:

- Rehabilitating the existing pavement between the Orchard Street interchange and Eisenmann Road interchange; and
- Rehabilitating the Orchard Street interchange underpass.



Figure 2.3
Broadway Avenue Interchange
Single Point Urban Interchange

Proposed I-84 Mainline Improvements:

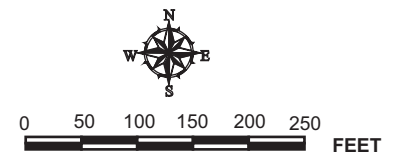
Mainline Segment	Lanes	Shoulders	Median
Broadway Avenue to Gowen Road	Three 12' lanes each direction	Two 12' shoulders each direction	32' paved median



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NOTE: Solid colored areas indicate estimated right-of-way acquisition needed.



Figure 2.4
 Gowen Road Interchange
 Conventional Diamond with Additional
 Lanes and Southeast Loop Ramp



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Proposed I-84 Mainline Improvements:

Mainline Segment	Lanes	Shoulders	Median
Broadway Avenue to Gowen Road Gowen Road to Eisenmann	Three 12' lanes each direction Two 12' lanes each direction	Two 12' shoulders each direction One 10' shoulder and one 4' shoulder each direction	32' paved median 68' unpaved median



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NOTE: Solid colored areas indicate
 estimated right-of-way acquisition needed.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER EVALUATION

2.5.1 Transit Alternatives Eliminated From Further Evaluation

Prior to this project, a preliminary feasibility study was prepared for ITD to determine the potential need for high occupancy vehicle (HOV) facilities along the I-84 and I-184 corridors in Ada and Canyon Counties. The Orchard Street to Gowen Road project area is located within the original HOV study area.

The full extent of the I-84 / I-184 HOV feasibility study extended from the Franklin Boulevard (US 20-26) interchange in Caldwell, Idaho, east to the Gowen Road interchange in Boise Idaho. The total length of the study corridor was approximately 30 miles in length. Also included in this study was the I-184 connector segment.

A key purpose of this study was to work towards a possible HOV master plan that may be used as a reference to any future improvements made to the I-84/I-184 corridor. Currently, there are no provisions for the inclusion of a HOV lane along this segment of I-84 or I-184. The study incorporated the use of observed vehicle occupancy counts and any available data from the ITD and COMPASS forecast models. The study was based upon the operational alternative assumption with the HOV requiring occupancy of two or more persons for each vehicle. Also included in the HOV assumption is that carpools, buses, and motorcycles will be included into the HOV values studied in this analysis.

While the HOV study addressed a much larger area, the study found that within the Orchard Street to Gowen Road project area:

- The segments of I-84 through the Wye interchange meet the minimum standards for lane productivity¹ but do not provide acceptable values in the cost benefits analysis.
- The segments of I-84 from the Wye interchange to Gowen Road meet the minimum standards for lane productivity and provide acceptable values in the cost benefits analysis. High occupancy vehicle lanes should be considered for HOV system development.

While the I-84 corridor from the Wye interchange to Gowen Road does meet the criteria for providing HOV lanes, it is not being considered at the time for construction because there are physical features along the I-84 corridor to the west of the Orchard Street interchange that would not allow for a continuous HOV facility to be constructed to the west of the interchange. The configuration of the WYE interchange west of Orchard Street does not have an economically justifiable way to construct a continuous HOV

¹ Lane productivity is a value that describes how HOV lanes relate to the general use lane in terms of movement of people. A value of 1.0 is considered ideal lane productivity. Values over 0.90 are the minimum acceptable values of lane productivity.

facility through the facility because an underpass constricts the public right-of-way and does not have enough width to construct an additional lane. The existing I-84 eastbound lane configuration does not allow for additional lanes because of the "y" split of the eastbound lanes between I-84 and I-184. An HOV lane in the median of the eastbound side would be forced to merge with general use lanes prior to the "y" split.

In addition, a regional HOV facility would need to be reviewed and approved by COMPASS since it is a regional facility, which is beyond the scope of this project. The existing right-of-way and proposed design would allow for the addition of a transit facility should it be desirable in the future.

2.5.2 Interchange Alternatives Eliminated From Further Evaluation

In addition to the alternatives advanced to the EA, 15 interchange alternatives were initially developed and presented to the public, but were removed from further consideration for one or more reasons. Alternatives were evaluated using criteria (described in Section 2.1) such as how well the alternative would meet LOS standards, construction and right-of-way costs, and impacts to properties located adjacent to the interchange.

2.5.2.1 Alternatives No Longer Considered for the Orchard Street Interchange

All of the Orchard Street interchange alternatives considered would operate at the same level of service, making LOS a non-factor in determining which Orchard Street alternative(s) would be further evaluated. Alternatives 1, 1A and 2 were not advanced for the reasons described below.

Alternative 1: Conventional Diamond with Additional Lanes

This alternative would have maintained all existing alignments, but would have provided roadway and ramp widening where additional capacity and geometric modifications would be needed to meet current design standards. Alternative 1 would have maintained the existing alignment of Orchard Street but additional right-of-way needs would have displaced six residences and two businesses, resulting in a more substantial impact than any other alternative considered for the interchange and was the reason why this alternative was removed from consideration.

Alternative 1A: Conventional Diamond with Additional Lanes and Skewed Ramps

This alternative was very similar to Orchard Street Alternative 1, but would have provided ramp alignments that were slightly skewed (e.g. 22%) from perpendicular to reduce the right-of-way requirements and costs. Although right-of-way requirements were reduced compared to Alternative 1, this alternative was removed from further consideration because of slightly higher right-of-way costs and impacts to businesses compared to Alternative 2A, which was advanced to the EA.

Alternative 2: Conventional Diamond with Additional Lanes on a New Alignment

This alternative had the same general lane configuration as the Orchard Street Alternatives 1 and 1A but would have relocated the Orchard Street bridge structure over I-84 to the west to better align with Orchard Street to the south. The realignment would have shortened the bridge span and would have allowed the existing bridge to remain in use during most of the construction period. This alternative would have included construction of a new bridge structure in a new location, would have maintained the existing ramp separation and would have widened existing ramps to increase capacity. The skewed alignment would have required relocation of a portion of Victory Road. Alternative 2 was removed from further study because it would have required more right-of-way, affected one more business, and would have been more expensive to construct than Alternative 2A.

2.5.2.2 Alternatives No Longer Considered for the Vista Avenue Interchange

Alternative 1: Conventional Diamond with Additional Lanes

This alternative would have maintained all existing alignments, but would have provided roadway and ramp widening to meet current design standards. A portion of Wright Street would have needed to be realigned under this alternative. Alternative 1 was removed from further evaluation primarily because it would not meet acceptable LOS standards.

Vista Avenue Interchange Alternative 1A: Tight Diamond Interchange

This alternative would have constructed a traditional diamond interchange, but with a decreased separation between the ramp terminals to minimize the right-of-way requirements. The ramp separation distance would be 500-ft. Alternative 1A was removed from further evaluation because it would not have met acceptable LOS standards.

Alternative 2: Conventional Diamond with Additional Lanes and a Southeast Loop Ramp

This alternative would have the same general lane configuration as Vista Avenue Alternative 1, but would have added a loop ramp in the southeast quadrant to improve traffic flow from eastbound I-84 to northbound Vista Avenue. As with the other Vista Avenue alternatives not advanced, this alternative would not have met acceptable LOS and it would have affected several residences and businesses.

Alternative 3: Conventional Diamond with Additional Lanes and a Northwest Loop Ramp

This alternative would have had the same general lane configuration as Vista Avenue Alternative 1, but would have added a loop ramp in the northwest quadrant to facilitate traffic from westbound I-84 to the Boise Airport. While the additional loop ramp would have improved operations at the westbound ramp terminal, LOS would still not be

adequate to accommodate projected traffic volumes. This alternative also would displace the most residences of any of the Vista Avenue alternatives considered.

Alternative 4: Conventional Diamond with Additional Lanes and Two Loop Ramps

This alternative was a combination of Vista Alternative 2 (southeast loop ramp) and Vista Alternative 3 (northwest loop ramp). Vista Alternatives 1 and 1A did not provide adequate capacity for either ramp terminal. Vista Alternative 2 improved the eastbound ramp terminal's intersection and Vista Alternative 3 improved the westbound ramp terminal's intersection. This alternative would have improved the entire interchange area to LOS D or better for the p.m. peak hour under forecast Year 2035 conditions. Alternative 4 would have included the construction of new bridge structure in new location and would have widened existing ramps to increase capacity. The additional loop ramps increased the existing ramp separation. It also decreased the distance to the Elder Street/Sunrise Rim Road and the Airport Way/Wright Street intersections. The additional right-of-way necessary for the loop ramp has a negligible affect to the businesses in the northwest quadrant, but would have had a considerable impact to the businesses in the southeast quadrant of the interchange.

Alternative 6: Single Point Urban Interchange (SPUI) with Airport Ramps

This alternative would have constructed a SPUI in place of the existing Vista Avenue interchange, similar to Vista Avenue Alternative carried forward. Because the single point interchange has only the one major intersection, the separation distances to the Airport Way and Elder Street/Sunrise Rim Road intersections would be increased compared to the existing interchange and to other alternatives considered for this interchange.

Under Vista Avenue Interchange Alternative 6, a ramp would have been built west of the proposed interchange to access the Boise Airport parking structure and loop road, alleviating the need for all traffic entering and exiting the airport to use the new Vista Avenue interchange by providing the airport with its own dedicated access to and from I-84. This alternative was removed from further study because right-of-way that would be required to construct the ramp west of the interchange was no longer available due to construction of office buildings on the site by the private landowner.

2.5.2.3 Alternatives No Longer Considered for the Broadway Avenue Interchange

All of the Broadway Avenue interchange alternatives are based on variations of the basic diamond configuration. These alternatives are no longer being considered as they would not meet the desired LOS primarily due to the capacity limitations of the surrounding local street network.

Alternative 1: Conventional Diamond with Additional Lanes

This alternative would have maintained all existing alignments, and would have provided roadway and ramp widening where additional capacity was needed. This alternative was not advanced because it would not provide an acceptable LOS.

Alternative 1A: Restricted Diamond with Additional Lanes

This alternative would have been very similar to Broadway Avenue Alternative 1, but would have provided a smaller ramp separation to minimize the right-of-way requirements. This alternative would have had the least amount of right-of-way and lowest cost, however, the poor LOS made this option undesirable.

Alternative 2: Conventional Diamond with Additional Lanes and a Southeast Loop Ramp

This alternative would have had the same general lane configuration as Broadway Avenue Alternatives 1 and 1A but would have added a loop ramp in the southeast quadrant to facilitate traffic from eastbound I-84 to northbound Broadway Avenue. Alternative 2 was not advanced because it would not have provided adequate capacity at the eastbound ramp terminal.

Alternative 3: Conventional Diamond with Additional Lanes and a Northwest Direct Ramp

This alternative would have had the same general lane characteristics as Broadway Avenue Alternative 2 but would have added a direct ramp in the northwest quadrant (in place of the loop ramp in the southeast quadrant) to facilitate traffic from southbound Broadway Avenue to westbound I-84. Alternative 3 was removed from consideration due to the amount of right-of-way required and the lack of capacity it would have provided.

Alternative 4: Conventional Diamond with Additional Lanes, Southeast Loop Ramp and a Direct Ramp Broadway Alternative

This alternative is the combination of two Broadway Avenue interchange alternatives no longer considered (Alternative 2: southeast loop ramp and Alternative 3: northwest direct ramp). This alternative would have included construction of a new bridge structure in the current location and would have widened the existing ramps to increase capacity. The additional right-of-way necessary for the loop ramp would have affected businesses in the southern quadrants and homes in the northwest quadrant of the interchange. Alternative 4 was removed from consideration because of its impacts to adjacent property.

2.5.2.4 Alternatives No Longer Considered for the Gowen Road Interchange

Alternative 1: Conventional Diamond with Additional Lanes

This alternative would have removed the existing I-84 bridge structures, widened Gowen Road to five lanes, constructed two new bridge structures in the same location, and

reconstructed the existing ramps to increase capacity and meet current design standards. This alternative would have met the projected capacity needs and would have had similar right-of-way impacts as the other alternatives. Alternative 1 was removed from consideration because it would not have provided flexibility during construction for detours.

Alternative 1A: Restricted Diamond with Additional Lanes

This alternative is very similar to Gowen Road Alternative 1 but with a smaller ramp separation to minimize the right-of-way requirements. As with Alternative 1, this alternative was removed from consideration because it would not have provided flexibility during construction for detours.